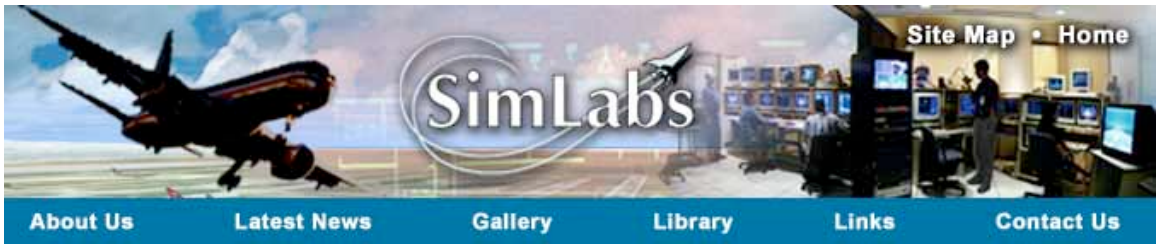

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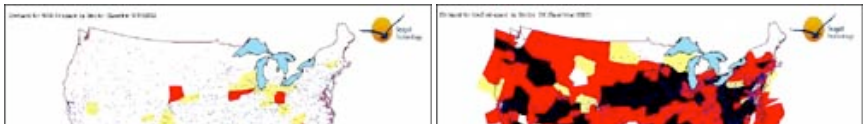
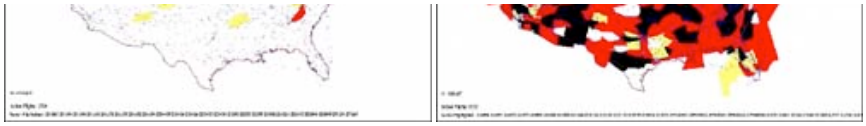
Welcome New Subscribers!
If you are receiving this newsletter for the first time, SimLabs News is a quarterly publication reviewing current projects at the *NASA* Ames Simulation Laboratories (SimLabs). *NASA* SimLabs is comprised of three unique Flight Simulators, an Air Traffic Control radar simulator and a high fidelity Air Traffic Control Tower simulator. The facilities support government as well as private industry in a wide array of applications. To find out more, read on!

1. *NASA* SimLabs Has "*ACES*" Up Its Sleeve

NASA is facing up to a tough question: how to assess the impact of proposed upgrades to the National Airspace System (*NAS*) intended to tackle the dramatically increased traffic levels forecasted in the coming decades. The Airspace Concept Evaluation System (*ACES*) may be the answer, and the payoff will be greater efficiency and reduced delays achieved by focusing resources on the upgrades that will have the highest return on investment.

Mid-day Demand for Sector Airspace





Baseline Demand (2002) *Future 2X Demand*

80–125% of sector capacity *125 - 200% of sector capacity* *>200% of sector capacity*

The Virtual Airspace Modeling and Simulation (*VAMS*) Project is developing *ACES* to simulate system-wide operations. *ACES* uses a large-scale, distributed simulation framework to model the propagation of traffic flow disturbances throughout the *NAS*.

A new *ACES* Lab is part of the *NASA* SimLabs suite of simulation facilities and is scheduled to become operational in November 2004. *ACES* provides a flexible *NAS* simulation and modeling environment that can assess the impact of new *NAS* tools, concepts, and architectures, including those that represent a significant departure from the existing *NAS* operational paradigm. *ACES* modeling services are available to other government agencies as well as the private sector.

ACES uses an agent-based modeling approach to represent the individual behaviors of airspace participants and to capture the critical ripple effect of one user's actions on other system participants. It currently models Traffic Flow Management, Air Traffic Control, Airline Operations Centers, aircraft, en route winds, and airport operating conditions, across multiple sectors and multiple airports.

On-going enhancements will add the effects of weather, interactive models, communications, navigation and surveillance technologies, and economic impacts. As new concepts evolve, the individual models can be replaced.

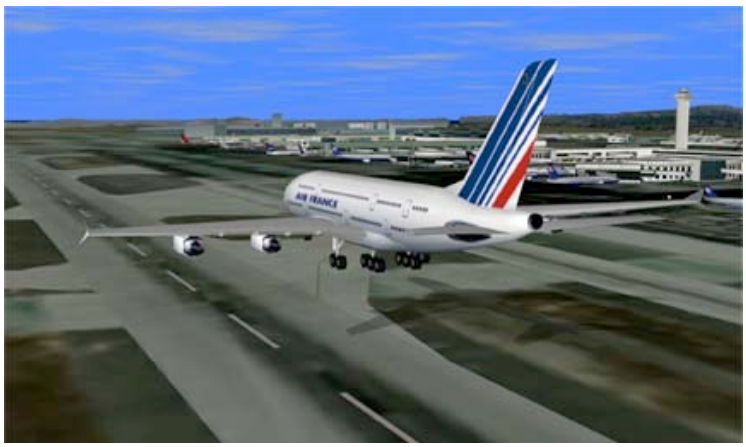
The aviation research community can play its "ace" by utilizing the *ACES* tool to make decisions on changes to the *NAS*. Understanding the benefits of upgrades before large investments are made will ensure that research and development dollars are wisely spent.

2. Obstacle Clearance Zones for New Large Aircraft

Picture this. It's 2006. You're piloting a new Airbus A380 on approach to Kennedy International Airport when just 30 feet over the threshold the tower issues a "go-around" (an instruction to abort your landing). There's debris on the runway from another aircraft's blown tire.

Your training and experience kick in as you initiate the go-around procedure. You quickly push the throttles forward and set go-around thrust, retract the wing flaps, and wait for the engines to spool up to nearly full power and for the flap changes to take effect. You ensure a positive climb, then raise the landing gear. All while you are working with your copilot, who is communicating with a tower controller who is providing air traffic information, heading and altitude instructions.

Will your response time and the performance of the 400 ton aircraft allow you to safely clear all obstacles in the airport vicinity: towers, hotels, signs, parking structures and terrain? That's what the *FAA*'s Obstacle Clearance Panel is working to ensure through its recent use of *NASA* SimLabs high-fidelity motion B747-400 simulator.



Airbus A380 aborts a landing

The Panel recently completed a study on the *NASA* SimLabs B747-400 flight simulator, aimed at evaluating pilot-aircraft performance during balked landing operations. This effort is in support of an international effort being led by the International Civil Aviation Organization (*ICAO*). Their goal is to develop mathematical pilot models for use in defining obstacle free clearance zones for future new large aircraft (*NLA*).

To capture extreme low probability aborts, it was essential that all forms of environmental and random variations be simulated. Environmental variation included a range of winds and turbulence conditions. Random variations were of two kinds: intra-pilot (differences from occasion to occasion), and inter-pilot variation (differences between pilots).

Thirteen pilot subjects flew over 700 total approaches during the course of the study. Local controller calls to abort occurred at heights of 10 feet, 20 feet, 35 feet, and 50 feet.

Aircraft position relative to intended flight track, as well as audio and video recordings were collected. Pilots completed pre- and post-flight questionnaires to supplement the simulation data. The data collected will ultimately be used to define the lateral and vertical dispersions for *NLA*, a vital component in the safe design of flight procedures and airport modifications.

3. The Pilot's Perspective on End-around Taxiways

SimLabs recently supported the *FAA* in moving one step closer to approval of End-Around Taxiways (*EAT*) at Dallas / Fort Worth International Airport. Using the Crew-Vehicle System Research Facility (*CVSRF*), an *FAA* and MITRE human factors team conducted a study which evaluated a pilots' ability on departure to distinguish between an aircraft on the *EAT* and an aircraft crossing the runway downfield. The *CVSRF* was chosen because of its ability to replicate the *EAT* aircraft and crossing aircraft with a high degree of fidelity.

View of aircraft crossing runway downfield

End-Around Taxiways will help with airport congestion and potentially reduce runway incursions. *EAT* have received partial approval at Hartsfield Atlanta International Airport. The researchers are studying the human factors issues associated with *EAT* operation with a plan to establish new standards for all airports that would use *EAT* operations. "We are very concerned with potential pilot "desensitization" or even confusion when *EAT* operations are on-going and an assumption might be made that a crossing aircraft is on the *EAT*," says Mark Reisweber, *FAA* engineering psychologist. An *FAA* report including results from the *CVSRF* study is in progress.

4. Mars: It Was Like Being There!

In August, FutureFlight Central opened it doors to over 500 enthusiastic Ames staff to view images from the Mars Exploration Rover (*MER*) mission. FutureFlight Central's 360-degree panoramic viewing format provided a unique perspective of the Endurance and Bonneville craters and other sites, including stereo viewing with 3D glasses. A 20-minute narrated presentation developed with the assistance of Ames scientist, Nathalie Cabrol, explained geological features and discoveries and was well received by the attendees. Commented one visitor, "It's as close to being on Mars as you could get."

Ames staff enjoy views of Mars

5. Upcoming Events and Conferences

Look for us at these future industry events:

49th Annual Air Traffic Control Association (*ATCA*) Conference and Exposition
October 31 – November 3, 2004
Washington, D.C.

Interservice/Industry Training, Simulation and Education Conference (*I/ITSEC*)
Look for SimLabs in the OneNASA Booth
December 6-9, 2004
Orlando, Florida

6. Thinking of Doing Business with *NASA* SimLabs?

For more information on what we can do for your needs, contact:

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